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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application of: Hans Biermaier                      Art Unit: 1744  
Serial No.: 09/831,585  
Filed: July 27, 2001  
Confirmation No.: 7039  
For: DEVICE FOR THERMAL STERILIZATION OF LIQUIDS  
Examiner: Monzer R. Chorbaji

August 30, 2006

**SECOND AMENDED APPEAL BRIEF**

This is an appeal from the rejection of the claims of the above-identified application made in the Office action dated December 30, 2005. A Notice of Appeal was filed on March 30, 2006.

This Second Amended Appeal Brief is being submitted in response to the Notification of Non-Compliant Appeal Brief dated August 24, 2006.

**I. REAL PARTY IN INTEREST**

The real party in interest in connection with the present appeal is the inventor, Hans Biermaier of Derching, Germany, owner of 100 percent interest in the pending application.

**II. RELATED APPEALS AND INTERFERENCES**

Appellant is unaware of any pending appeals or interferences which may be related to, directly affect or be directly affected by, or have a bearing on, the Board's decision in the pending appeal.

### **III. STATUS OF CLAIMS**

Claims 11 and 13-30 are currently pending in the application. Claims 1-10 and 12 were previously cancelled. A copy of the pending claims appears in the Claims Appendix of this Brief.

Claims 22 and 30 stand rejected under 35 U.S.C. §102(e) as being anticipated by U.S. Patent No. 6,059,965 (Laing).

Claims 11, 13, 14, 20, 21, 23, and 29 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Laing in view of U.S. Patent No. 6,402,897 (Gunn).

Claim 24 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Laing as applied to claim 22 and in further view of U.S. Patent No. 5,251,689 (Hakim-Elahi).

Claims 26-28 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Laing as applied to claim 22 and in further view of U.S. Patent No. 5,687,678 (Suchomel).

Claims 15, 16 and 25 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Laing in view of Gunn as applied to claim 11 and further view of Hakim-Elahi.

Claims 17-19 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Laing in view of Gunn as applied to claim 11 and in further view of Suchomel.

The rejections of claims 11, 13-22, and 24-30 are being appealed.

### **IV. STATUS OF AMENDMENTS**

No amendments have been filed after the Office action dated December 30, 2005.

### **V. SUMMARY OF CLAIMED SUBJECT MATTER**

The following summary correlates claim elements to specific embodiments described in the application

specification, but does not in any manner limit claim interpretation. Rather, the following summary is provided only to facilitate the Board's understanding of the subject matter of this appeal.

Claim 11 is directed to a device 1 for thermal sterilization of liquids. See page 6, lines 29-30 and Figs. 1a and 1b. The device 1 generally comprises a counterflow heat exchanger including a conduit 3 with a heating section 4 and a cooling section 5 in fluid connection with one another. See page 7, lines 20-30 and Figs. 1a and 1b. The device 1 also comprises a heating source 13 for heating the liquid. See page 7, lines 8-14 and Figs. 1a and 1b. The heating section 4 and the cooling section 5 are spirally arranged around the heating source 13. See page 7 lines 20-28 and Figs. 1a and 1b. The heating source 13 is generally located in the center of the spiral. See page 7, lines 8-9 and Figs. 1a and 1b. The conduit 3 is constructed of flexible material. See page 9, lines 11-14 and Figs. 1a-4b. Individual windings of conduit 3 lay one on the other and contact each other. See page 7, line 20 through page 8, line 4 and Figs. 1a-4b. A check valve 7 allows liquid flow only in a direction from the heating section 4 to the cooling section 5. See page 7, lines 1-4 and Figs. 1a and 1b.

Claim 15 depends from claim 11 and recites that the conduit 3 comprises two elastic films 22, 23 welded to one another at their lengthwise edges 24, 25. See page 9, lines 1-3 and Figs. 2a and 2b.

Claim 16 depends from claim 11 and recites that the conduit 3 comprises first, second and third elastic films 22, 23, 26 welded to one another at their lengthwise edges and wherein the first and second films 22, 23 are separated from

each other by the third film 26. See page 9, lines 11-16 and Figs. 3a and 3b.

Claim 17 depends from claim 11 and recites that the conduit 3 comprises two tubular individual conduits 31, 32 arranged one inside the other. See page 9, lines 27-29 and Fig. 4.

Claim 18 depends from claim 11 and recites that the individual windings of conduit 3 lie in the same plane. See page 8, lines 12-14 and Fig. 1a.

Claim 19 depends from claim 11 and recites that the individual windings of the conduit 3 are arranged in a spherical form. See page 6, lines 30-31, page 8, lines 14-16, and Fig. 1a.

Claim 20 depends from claim 11 and recites that the conduit 3 is made of a metal film. See page 3, lines 9-11.

Claim 21 depends from claim 11 and recites that the conduit 3 is made of a plastic film. See page 3, lines 9-11.

Claim 22 is directed to a thermal sterilizer for liquids comprising a counterflow heat exchanger including a conduit 3 with a heating section 4 and a cooling section 5 in fluid connection with one another. See page 7, lines 20-30 and Figs. 1a and 1b. The sterilizer also comprises a heating source 13 for heating the liquid. See page 7, lines 8-14 and Figs. 1a and 1b. The heating section 4 and the cooling section 5 are spirally arranged around the heating source 13. See page 7 lines 20-28 and Figs. 1a and 1b. The conduit 3 is constructed of flexible material. See page 9, lines 11-14 and Figs. 1a-4b.

Claim 24 depends from claim 22 and recites that the conduit 3 comprises two elastic films 22, 23 welded to one another at their lengthwise edges 24, 25. See page 9, lines 1-3 and Figs. 2a and 2b.



Claim 25 depends from claim 11 and recites that the conduit 3 comprises first, second and third elastic films 22, 23, 26 welded to one another at their lengthwise edges and wherein the first and second films 22, 23 are separated from each other by the third film 26. See page 9, lines 11-16 and Figs. 3a and 3b.

Claim 26 depends from claim 22 and recites that the conduit 3 comprises two tubular individual conduits 31, 32 arranged coaxially one inside the other. See page 9, lines 27-29 and Fig. 4.

Claim 27 depends from claim 22 and recites that the individual windings of conduit 3 lie in the same plane. See page 8, lines 12-14 and Fig. 1a.

Claim 28 depends from claim 22 and recites that the conduit 3 are arranged in a spherical form. See page 6, lines 30-31, page 8, lines 14-16, and Fig. 1a.

Claim 29 depends from claim 22 and recites that the conduit 3 is made of a metal film. See page 3, lines 9-11.

Claim 30 depends from claim 22 and recites that the conduit 3 is made of a plastic film. See page 3, lines 9-11.

#### **VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL**

A. Appellant appeals the rejections of claims 22 and 30 under 35 U.S.C. §102(e) as being anticipated by U.S. Patent No. 6,059,965 (Laing).

B. Appellant appeals the rejections of claims 11, 13, 14, 20, 21, and 29 under 35 U.S.C. §103(a) as being unpatentable over Laing in view of U.S. Patent No. 6,402,897 (Gunn).

C. Appellant appeals the rejection of claim 24 under 35 U.S.C. §103(a) as being unpatentable over Laing as applied to

claim 22 and in further view of U.S. Patent No. 5,251,689 (Hakim-Elahi).

D. Appellant appeals the rejections of claims 26-28 under 35 U.S.C. §103(a) as being unpatentable over Laing as applied to claim 22 and in further view of U.S. Patent No. 5,687,678 (Suchomel).

E. Appellant appeals the rejections of claims 15, 16 and 25 under 35 U.S.C. §103(a) as being unpatentable over Laing in view of Gunn as applied to claim 11 and further view of Hakim-Elahi.

F. Appellant appeals the rejections of claims 17-19 under 35 U.S.C. §103(a) as being unpatentable over Laing in view of Gunn as applied to claim 11 and in further view of Suchomel.

## **VII. ARGUMENT**

### **A. Claims 22 and 30 are unanticipated by Laing.**

#### **1. Claim 22**

Claim 22 is directed to a thermal sterilizer for liquids comprising:

a counterflow heat exchanger including a conduit with a heating section and a cooling section in fluid connection with one another,

a heating source for heating the liquid,  
the heating section and the cooling section being spirally arranged around the heating source,  
said conduit being constructed of flexible material.

Claim 22 is unanticipated by and patentable over U.S. Patent No. 6,059,965 (Laing) because Laing fails to disclose a

thermal sterilizer for liquids comprising **a conduit constructed of flexible material.**

As shown in Figs. 1 and 2, Laing discloses a device for sterilizing a stream of water comprising a counter-flow heat exchanger. The heat exchanger includes a housing having an outer wall 1 and two endplates 2 for capping the two ends of the outer wall. Only one of the endplates 2 is shown in Fig. 2. A heating element 11 is located in the housing for heating incoming water to a sterilization temperature. As shown in Fig. 1, the heating element 11 is located adjacent the center of the housing. Also located in the housing are spirally configured heat transferring walls 15 for directing the incoming water to the heating element 11, and directing outgoing water (i.e., water that has past the heating element) away from the heating element. The heat transferring walls 15 accordingly to Laing are preferably made from plastic. See column 1, lines 58-59.

Importantly, Laing further discloses that the endplates have spiral grooves 3, into which the upper and lower edges of the heat transferring walls 15 are inserted. See Fig. 2 and column 1, lines 57-59. Moreover, the ends of the heat transferring walls 15 extend into slots 5, 6, 7, 12, arranged parallel to the axis of the housing formed in the outer wall 1 and the endplates 2. See Fig. 1 and column 1, lines 59-61. In other words, the heat transferring walls of Laing are held in place by inserting the periphery of the walls into slots/grooves formed in the housing. Thus, the walls 15 must be rigid in order to remain in place.

To anticipate a claim, a single cited reference must disclose, explicitly or inherently, each and every element of the claim. M.P.E.P. §2131 citing *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053

(Fed. Cir. 1987). In this case, Laing does not disclose, either explicitly or inherently, a conduit constructed of a flexible material.

While not specifically stated in the Office action, it appears that the Examiner has taken the position that Laing's heat transferring walls correspond to the claimed conduit. However, nowhere does Laing explicitly state that the heat transferring walls are constructed from a flexible material as recited in claim 22.

As a result, the Examiner has relied on the disclosure in Laing that states that the heat transferring walls are preferably made of plastic. See page 2, paragraph 3 of the Office action dated December 30, 2005. As further described below, it is more likely than not that the heat transferring walls of Laing are made from a rigid plastic and not a flexible material as recited in claim 22. Thus, Laing also fails to inherently indicate that the heat transferring walls are made from a flexible material as recited in claim 22.

To establish inherency, the prior art "must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill. Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient." M.P.E.P. §2112 citing *In re Robertson*, 49 USPQ2d 1949, 1950-51 (Fed. Cir. 1999). Such evidence is clearly absent in this case.

As mentioned above, the heat transferring walls of Laing are held in place by inserting the ends and edges (i.e., the periphery) of the walls into slots/grooves formed in the endplates and outer wall. **In order for the walls to remain in place, especially while water is being pumped between the**

**walls, the walls must be sufficiently rigid to hold their shape.** If the walls were not sufficiently rigid, the walls of Laing would bow inwardly and the ends and edges of the walls would disengage from the slots/grooves in the endplate and outer wall. Thus, the plastic heat transferring walls of Laing are clearly not necessarily constructed from a flexible material.

In contrast, claim 22 recites that the conduit is constructed of flexible material (see final paragraph of page 4 of the application). By the flexibility of the conduit, a "peristaltic motion" arises, which promotes additional transport of the water by producing a pulsing water flow through the heat exchanger with phases of higher and lower flow velocity. Because of this "pump effect" of the conduit, the device operates even with very minimal water pressure at the heat exchanger inlet (see page 5, first paragraph of the application).

Since Laing does not explicitly or inherently disclose a conduit constructed from a flexible material as recited in claim 22, claim 22 is unanticipated by and patentable over Laing.

## **2. Claim 30**

Claim 30, which depends from claim 22, further recites that the conduit is made of a plastic film. In the rejection of claim 30, the Examiner again relies on the disclosure in Laing that the heat transferring walls are preferably made from plastic. See page 3, first two lines of the Office action dated December 30, 2005.

As mentioned above, to anticipate a claim, a single cited reference must disclose, explicitly or inherently, each and every element of the claim. M.P.E.P. §2131 citing *Verdegaal*

*Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). In this case, Laing does not disclose, either explicitly or inherently, a conduit being made of a plastic film. It is entirely possible that the heat transferring walls of Laing are made from plastic but not a plastic film as recited in claim 22.

As a result, claim 30 is further unanticipated by and patentable over Laing.

**B. Claims 11, 13, 14, 20, 21, and 29 are patentable over Laing in view of Gunn.**

**1. Claims 11, 13, and 14**

Claim 11 is directed to a device for thermal sterilization of liquids comprising:

- a counterflow heat exchanger including a conduit with a heating section and a cooling section in fluid connection with one another,

- a heating source for heating the liquid,
  - the heating section and the cooling section being spirally arranged around the heating source,

- the heating source being generally located in the center of the spiral,

- said conduit being constructed of flexible material,
    - individual windings of conduit lying one on the other and contacting each other, and

- a check valve for allowing liquid flow only in a direction from the heating section to the cooling section.

Claim 11 is submitted to be patentable over Laing in view of U.S. Patent No. 6,402,897 (Gunn) because whether considered alone or in combination, these references fail to teach or

suggest a device for thermal sterilization of liquids comprising **a conduit constructed of flexible material.**

Laing, as described above, discloses a device for sterilizing a stream of water comprising a counter-flow heat exchanger. The heat exchanger includes a housing having an outer wall 1 and two endplates 2 for capping the two ends of the outer wall. Only one of the endplates 2 is shown in Fig. 2. A heating element 11 is located in the housing for heating heats incoming water to a sterilization temperature. As shown in Fig. 1, the heating element 11 is located adjacent the center of the housing. Also located in the housing are spirally configured heat transferring walls 15 for directing the incoming water to the heating element 11, and directing outgoing water away from the heating element.

In Laing, the heat transferring walls do not appear to be constructed of flexible material. Instead, the heat transferring walls appear to be made from a rigid, non-flexible material (e.g., a rigid plastic) so that the walls remain in engagement with the endplates and the outer wall during use of Laing's device.

Gunn likewise fails to teach or suggest a conduit constructed of flexible material as recited in claim 11. Gunn discloses a distillation unit performing the functions of a distillation unit and a water heater (column 3, line 53). Impure feed water from feed pipe 9 flows through a first heat exchanger (called "distilled water cooler 35"), then via feed pipe 9 through a "concentrate heat exchanger 23", then via line 9d through another heat exchanger 9e, and finally into a distillation unit 5. Within this distillation unit the feed water is separated into two components, 1) distilled steam and 2) concentrate. Gunn does not show or suggest a conduit

constructed of flexible material nor does the Examiner assert otherwise.

Obviousness can only be established if all of the claimed features are taught or suggest by the prior art references. M.P.E.P. §2143.03 citing *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). Since neither Laing nor Gunn show or suggest a conduit constructed of a flexible material as recited in claim 11, a combination of these references likewise fails to show or suggest a conduit constructed of a flexible material.

As a result, claim 11 is nonobvious and patentable over the combination of Laing and Gunn. Claims 13 and 14 depend from claim 11 and are submitted to be patentable over Liang in view of Gunn for the same reasons.

## **2. Claims 20 and 29**

Claim 20 depends from claim 11 and further recites that the conduit is made of a metal film. Claim 29 depends from claim 22 and recites the same feature. As recognized by the Examiner, Laing fails to disclose a conduit made of a metallic material. See page 4, last two lines of the Office action dated December 30, 2005. As a result, the Examiner relies on Gunn. Gunn, as stated by the Examiner, teaches the use of thin sheets of metal for making a heat exchanger. See page 5, first line of the Office action dated December 30, 2005. However, the thin sheets of metal taught by Gunn are not the same as or analogous to a metal film as recited in claim 20. Instead, the thin sheets of metal disclosed in Gunn appear to be rigid. The claimed conduit, on the other hand, is made of a flexible material (claim 11) and, more particularly, a metal film (claim 20).



Thus, claims 20 and 29 are further patentable over Laing in combination with Gunn.

### **3. Claim 21**

Claim 21 depends from claim 11 and further recites that the conduit is made of a plastic film. As mentioned above with respect to claim 30, Laing does not disclose a conduit being made of a plastic film. Gunn also fails to teach or suggest this feature. Thus, a combination of Laing and Gunn also fails to teach or suggest a conduit made of a plastic film.

As a result, claim 21 is further patentable over Laing and Gunn.

### **C. Claim 24 is patentable over Laing as applied to claim 22 and in further view of Hakim-Elahi.**

Claim 24 depends from claim 22 and further recites that the conduit comprises two elastic films welded to one another at their lengthwise edges.

The rejection of claim 24 combines Laing with U.S. Patent No. 5,251,689 (Hakim-Elahi). The Examiner states that Hakim-Elahi "teaches the use of elastic materials in the art of designing heat exchangers." See page 5, paragraph 7 of the Office action dated December 30, 2005. Appellant agrees that elastic materials have been used before in heat exchangers. However, the rejection fails to state a convincing line of reasoning why one of ordinary skill would have combined Hakim-Elahi with Laing. The Examiner reasons that one of skill in the art would have combined Hakim-Elahi with Laing to design a flexible heat exchanger that can be easily coiled.

However, as mentioned above, the heat transferring walls of Laing need to be rigid for Laing's design to work. Thus, one of ordinary skill in the art would not replace the heat transferring walls of Laing with a flexible material because doing so would render Laing inoperable for its intended purpose. "If proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification." M.P.E.P. §2143.01 citing *In re Gordon*, 221 USPQ 1125 (Fed. Cir. 1984). Thus, there is no suggestion or motivation to combine Laing with Hakim-Elahi as asserted by the Examiner.

Accordingly, claim 24 is submitted as patentable for this additional reason.

**D. Claims 26-28 are patentable over Laing as applied to claim 22 and in further view of U.S. Patent No. 5,687,678 (Suchomel).**

In the rejection of claims 26-28, the Examiner relies on "design choice" as the motivation for the combination. See page 6, first paragraph of the Office action dated December 30, 2005. The assertion that it is well within the ordinary skill of the art or an obvious matter of design choice is insufficient to make out a *prima facie* case of obviousness. *Ex parte Levengood*, 28 U.S.P.Q.2d 1300, 1301 (BPAI 1993). When an Examiner fails to establish a *prima facie* case of obviousness, the appellant is under no obligation to submit evidence of nonobviousness. M.P.E.P. §2142. Therefore, claims 26-28 are patentable for this additional reason.

**E. Claims 15, 16 and 25 are patentable over Laing in view of Gunn as applied to claim 11 and further view of Hakim-Elahi.**

To the extent claims 15, 16, and 25, recite the same features as claim 24, claims 15, 16, and 25 are patentable over the combination of Laing, Gunn and Hakim-Elahi. Specifically, there is no suggestion or motivation in any of the cited references to replace the heat transferring walls of Laing with the elastic material of Hakim-Elahi since doing so would render Laing's device inoperable for its intended purpose. As a result, claims 15, 16, and 25 are further patentable over Laing, Gunn, and Hakim-Elahi.

**F. Claims 17-19 are patentable over Laing in view of Gunn as applied to claim 11 and in further view of Suchomel.**

In the rejection of claims 17-19, the Examiner again relies on "design choice" as the motivation for the combination. See page 7, paragraph 10 of the Office action dated December 30, 2005. As mentioned before, the assertion that it is well within the ordinary skill of the art or an obvious matter of design choice is insufficient to make out a *prima facie* case of obviousness. *Ex parte Levengood*, 28 U.S.P.Q.2d 1300, 1301 (BPAI 1993). When an Examiner fails to establish a *prima facie* case of obviousness, the appellant is under no obligation to submit evidence of nonobviousness. M.P.E.P. §2142. Therefore, claims 17-19 are patentable for this additional reason.

**CONCLUSION**

For the reasons stated above, appellant respectfully requests the Office's rejections be reversed and claims 11 and 13-30 be allowed.

While no fee is believed due at this time, the Commissioner is authorized to charge any fee due to Deposit Account No. 19-1345 in the name of Senniger, Powers.

Respectfully submitted,



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**VIII. CLAIMS APPENDIX**

11. A device for thermal sterilization of liquids comprising:

a counterflow heat exchanger including a conduit with a heating section and a cooling section in fluid connection with one another,

a heating source for heating the liquid,  
the heating section and the cooling section being spirally arranged around the heating source,

the heating source being generally located in the center of the spiral,

said conduit being constructed of flexible material,  
individual windings of conduit lying one on the other and contacting each other, and

a check valve for allowing liquid flow only in a direction from the heating section to the cooling section.

13. A device as set forth in claim 11 wherein the check valve is arranged on the heating section.

14. A device as set forth in claim 13 wherein the check valve is arranged at the inlet end of the heating section.

15. A device as set forth in claim 11 wherein the conduit comprises two elastic films welded to one another at their lengthwise edges.

16. A device as set forth in claim 11 wherein the conduit comprises first, second and third elastic films welded to one another at their lengthwise edges and wherein the first and second films are separated from each other by the third film.

17. A device as set forth in claim 11 wherein the conduit comprises two tubular individual conduits arranged one inside the other.

18. A device as set forth in claim 11 wherein the individual windings of conduit lie in the same plane.

19. A device as set forth in claims 11 wherein the individual windings of the conduit are arranged in a spherical form.

20. A device as set forth in claim 11 wherein the conduit is made of a metal film.

21. A device as set forth in claim 11 wherein the conduit is made of a plastic film.

22. A thermal sterilizer for liquids comprising:  
a counterflow heat exchanger including a conduit with a heating section and a cooling section in fluid connection with one another,  
a heating source for heating the liquid,  
the heating section and the cooling section being spirally arranged around the heating source,  
said conduit being constructed of flexible material.

23. A thermal sterilizer as set forth in claim 22 further comprising a check valve for allowing liquid flow only in a direction from the heating section to the cooling section.

24. A thermal sterilizer as set forth in claim 22 wherein the conduit comprises two elastic films welded to one another at their lengthwise edges.

25. A thermal sterilizer device as set forth in claim 11 wherein the conduit comprises first, second and third elastic films welded to one another at their lengthwise edges and

wherein the first and second films are separated from each other by the third film.

26. A thermal sterilizer as set forth in claim 22 wherein the conduit comprises two tubular individual conduits arranged coaxially one inside the other.

27. A thermal sterilizer as set forth in claim 22 wherein the individual windings of conduit lie in the same plane.

28. A thermal sterilizer as set forth in claims 22 wherein the individual windings of the conduit are arranged in a spherical form.

29. A thermal sterilizer as set forth in claim 22 wherein the conduit is made of a metal film.

30. A thermal sterilizer as set forth in claim 22 wherein the conduit is made of a plastic film.



**IX. EVIDENCE APPENDIX**

None.

**X. RELATED PROCEEDINGS APPENDIX**

None.